

LOGISTICS

This document provides updated guidance for creating and sustaining air and space forces. It applies to all active duty, reserve component, and civilian Air Force personnel. Chapter 1 provides an overview of logistics (from both the joint and Air Force perspectives) as well as the fundamental relationship between operations and logistics. Chapter 2 explains the eight interactive logistics processes to create and sustain air and space weapon systems. Chapter 3 describes the seven logistics principles and chapter 4 describes the seven logistics concepts. These principles and concepts provide an understanding of why logistics is a key building block in the foundation of military power.

SUMMARY OF REVISIONS

This revision shifts the document's focus from combat support for warfighting to logistics support for a variety of anticipated missions, including military operations other than war. The seven logistics principles were updated to correspond with Joint Pub 4-0 (*Doctrine for Logistic Support of Joint Operations*), and the seven logistics concepts were added. AFM 1-10 is no longer valid.

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Chapter 2

INTRODUCTION

1.1. General. This document contains Air Force logistics doctrine and discusses its relationship to military power. Chapter 1 describes fundamental relationships and the role of logistics in creating and sustaining air and space forces. Chapter 2 identifies the process of transforming resources into military capability. Chapter 3 explains the seven logistics principles and chapter 4 explains the seven logistics concepts.

1.2. Air and Space Weapon Systems. Air and space weapon systems are a complex combination of many elements. The most visible part of a weapon system is the platform (for example, an aircraft, an intercontinental ballistic missile, or a satellite). Other equally important elements of a weapon system are the tangible resources (people, materiel, facilities, and information) and the intangible resource (time) needed to deploy and employ each weapon system.

1.3. Fundamental Relationships. The sole purpose of logistics is to create and sustain military capabilities wherever and whenever needed. Operations planners determine the nature and timing of capabilities requiring support; however, all major decisions should be discussed with logisticians because logistics impacts strategy and operations. Therefore, logistics is an essential part of the overall military planning process. As with strategy and operations, logistics concerns should be considered during all phases of military planning.

1.3.1. There is a fundamental relationship between operations and logistics; military power achieves its full potential when operations and logistics harmonize to achieve maximum mission effectiveness. Ready and sustainable air and space weapon systems, and an appropriate consideration of logistics support requirements, greatly improve results.

1.3.2. Operation is defined in Joint Pub 1-02 (*Department of Defense Dictionary of Military and Associated Terms*) as “A military action or the carrying out of a strategic, tactical, service, training, or administrative military mission....” From the Air Force perspective, operations may be viewed as any military activity that deploys and employs air and space resources.

1.3.3. Logistics is defined in Joint Pub 1-02. The first sentence of that definition is: “The science of planning and carrying out the movement and maintenance of forces.” For the Air Force, logistics differs from the full joint definition and perspective in one significant manner. Air Force logistics excludes general engineering, health services, and other services such as laundry and graves registration. Logistics is also described in Joint Pub 4-0 (*Doctrine for Logistic Support of Joint Operations*) as an “art.” Readers

interested in understanding how logistics supports joint operations (for example, joint logistics planning, joint theater logistics, and directive authority for logistics) should read Joint Pub 4-0.

1.3.3.1. The purpose of Air Force logistics is to create and sustain force generation capabilities whenever and wherever needed to conduct military operations. On the broadest level, logistics is a key aspect of program management to acquire and sustain weapon systems. Air Force logistics at the base level includes the five specific functions of contracting, maintenance, supply, transportation, and logistics plans.

1.3.3.2. This doctrine document does not contain procedures describing how each individual logistics function is conducted. Rather, this document focuses on how logistics, as an entity, contributes to operational effectiveness. Readers interested in specific logistics “how to” procedures should review the appropriate logistics directives and instructions.

1.4. Levels of War. Air and space forces are part of the military instrument of national power. As such, they may be used at any level of war (strategic, operational, or tactical) to help achieve United States (US) National Military Strategy objectives. Logistics considerations are a key factor at each level of war, although the focus of these aspects varies, depending on the level.

1.4.1. The strategic level focuses on the broadest of issues. Based on the National Security interests and objectives established by the President, the Chairman of the Joint Chiefs of Staff develops the National Military Strategy. It is at this level that military requirements are developed, and national resources are used, to accomplish national strategic security objectives. Logistics considerations form part of the basis for developing global plans. One example is the Civil Reserve Air Fleet agreement to transport people and equipment. A second example is the production capacity to offset attrition of aircraft or spares. A third example is the stockpile of national reserves, for example, oil.

1.4.2. The operational level is where military forces are employed as part of major campaigns in a theater of operations. This level links the strategic and tactical levels. Operational level objectives are developed to support strategic objectives, and forces at the tactical level are provided with the means to carry out their missions. Regardless of the type of operation, logistics is a major factor in sequencing and sustaining forces. At this level, logistics focuses on the entire air campaign rather than the expected duration of operations at individual locations.

1.4.3. The tactical level is where unit operations are conducted to accomplish the military objectives set at the operational level. Logistics concerns at this level focus on

the support (for example, spare parts) required to generate individual sorties rather than on support for the overall campaign. In addition, objectives may be either lethal (that is, combat), or nonlethal (for example, logistics training programs associated with foreign internal defense).

1.5. Military Operations Other Than War. Military operations other than war also support national security interests and objectives. These operations use the military instrument of national power for any purpose not associated with major combat operations conducted pursuant to a declaration of war or authorized by a specific Congressional Act. These military operations range from peacetime operations such as providing assistance to civil authorities, to contingencies such as a show of force, to combat operations, to post-conflict restoration operations.

1.5.1. Logistics support for military operations other than war may involve more than providing supplies and equipment to US and host nation forces. It may also involve

determining potential host nation support capabilities; developing host nation logistics systems, infrastructure, and procedures; and training host nation logistics personnel.

1.5.2. If logistics elements are not the only forces deployed for a specific military operation other than war, they often precede other military forces into the area of operations. These advance logistics elements could be vulnerable from a security standpoint. Therefore, not only should logistics planners be included in the planning process from the inception of the operation, but appropriate security measures should also be included in the plan.

1.6. Summary. National security interests and objectives are translated into military requirements. Tangible resources (people, materiel, facilities, and information) are combined with intangible resources (for example, time) to produce military capability employed by commanders at all levels. The specific processes by which logistics creates and sustains weapon systems is the subject of the next chapter.

Chapter 3

LOGISTICS PROCESSES

2.1. General. The Air Force uses eight interactive logistics processes to meet military requirements. The first four processes (**definition, acquisition, maturation, and integration**) combine to create weapon systems. The final four processes (**distribution, preservation, generation, and disposition**) sustain weapon systems. Although the processes are shown in Figure 2.1 as discrete steps, the processes may overlap. For example, weapon systems may be simultaneously integrated and distributed.

2.1.1. Some of the processes may be concurrent, but all can vary in duration and scope depending on the weapon system. In essence, the eight logistics processes encompass the life cycle for all elements of a weapon system. The processes are adaptable for use in crisis, war, and operations other than war.

2.1.2. The logistics processes focus on military requirements. These requirements, either reactive or proactive, respond to an enemy threat or capability, enhance an existing capability, or create an entirely new one. Regardless, military requirements are at the heart of each logistics process.

2.1.3. The Air Force uses the definition process to determine how military requirements, based, for example, on various Air Staff planning documents, can be achieved. Procurement of air and space weapon systems to meet military requirements is accomplished through the acquisition process. Once acquired, weapon systems are tested, evaluated, and refined as part of the maturation process.

2.1.4. Air and space weapon systems are integrated into the force structure and distributed to their operating sites when required. US Air Force forces may be joined by forces from other Services and nations to complete the integration process. These forces are then made available for military

operations through ongoing preservation and generation processes. Finally, if a weapon system proves ineffective and cannot be modified to satisfy mission requirements, it may be assigned a new mission or be retired from the active Air Force inventory as part of the disposition process. Again, at any point during a weapon system's life cycle, the logistics processes are activated through the continuous identification and assessment of military requirements.

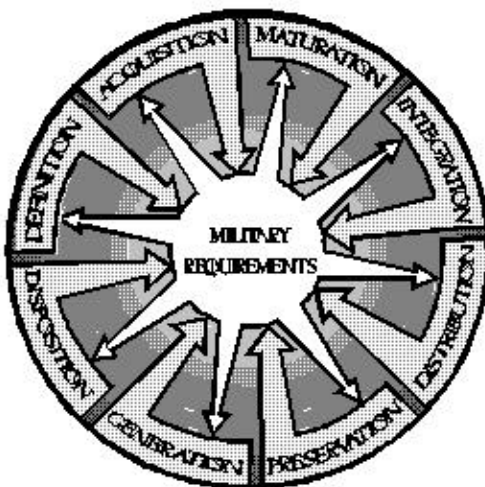
2.2. Definition. The planning, programming, and budgeting activity defines military requirements for future air and space environments. This process continuously adjusts objectives, programs, and budgets as threats, technologies, and national priorities change. A key aspect in this process is that logistics considerations are addressed in concert with the development of any military capability.

2.3. Acquisition. The acquisition process starts after the definition process and includes development, review, production, and procurement. This process needs to focus on obtaining systems that are effective, reliable, maintainable, supportable, and interoperable.

2.3.1. Life cycle cost factors are considered throughout the acquisition process to maximize weapon system capability while minimizing ownership cost. Concepts for new or modified systems are transformed by this process into a wide variety of products to improve military capability.

2.3.2. In addition to these products, the acquisition process ensures all other resources required to effectively employ air and space weapon systems are available when needed. For example, information concerning friendly and

Figure 2.1. Logistics Processes.



enemy forces is vital to command and control and needs to be acquired in a timely manner to support operations.

2.4. Maturation. The maturation of a weapon system involves progressive refinement to sustain or improve its effectiveness, reliability, maintainability, supportability, and interoperability. Refinement is accomplished to meet continuing or changing requirements based on evolving threats or technological advances.

2.4.1. This process requires extensive use of the weapon system and continues the ongoing programs of research and engineering development, as well as experimentation, started during the acquisition process. These programs help evaluate and improve a weapon system's capability and affordability based on technological opportunities and potential requirements.

2.4.2. As a weapon system matures, it is tested and evaluated to determine if supportability or performance problems exist. Maturation is enhanced when people are taught how to properly improve the weapon system to ensure readiness is maintained. Throughout this process, configuration management, control techniques, and procedures are applied to ensure future supportability and standardization.

2.5. Integration. Integration is the blending or joining together of weapon systems (or their elements) to meet military requirements. Because the Air Force may also sustain operations with other Services and allies, and perhaps with the host country to which deployed, effective logistics integration is a cornerstone in this process. Examples of logistics integration at this level can include joint and multinational plans and agreements, acquisition programs leading to common or interoperable weapon systems with interchangeable spares, technical and system integration into larger systems, and standardized terminology and procedures. Integration begins well in advance of operations and continues throughout all Air Force logistics processes.

2.6. Distribution. The distribution process encompasses all activities required to identify and transfer resources -- people, materiel, facilities, and information -- from one location to another. These activities involve four basic tasks: demand, movement, storage, and issue. Proper positioning of resources is vital to successful operations and is an essential task of military logistics.

2.7. Preservation. The preservation process involves protection of resources from environmental hazards, terrorist threats, weapons effects, theft, and other dangers. Preservation includes protecting people as well as materiel, and begins well in advance of actual operations. Proper training and education, coupled with necessary protective equipment, are vital to safe working and living locations. Materiel and facilities should be dispersed, concealed,

hardened, and protected from attack. Redundancy and diversity can protect weapon systems, and deception can be used to camouflage intentions.

2.8. Generation. Generation is the readying, or preparation, of weapon systems either for actual employment in a real-world situation or to practice for their employment in an exercise scenario. In the practice mode, generation duplicates or approximates actual readying of weapon systems. Practice generations should occur periodically to ensure weapon systems are available when needed.

2.8.1. Generation can lessen the cumulative environmental effects on weapon systems from factors such as corrosion, compression, and contamination. Other factors, such as age, intensity of use, design limitation, and exposure to combat may limit generation capacity.

2.8.2. Weapon systems are continually inspected because they can fail if deteriorated or damaged by attack or sabotage. Degraded or unusable equipment and facilities are repaired or upgraded, and then tested to meet military requirements. A weapon system may be serviced in addition to being repaired. Servicing can include performing sanitation activities and replenishing life support systems; petroleum, oils, and lubricants; munitions; and other consumables. One specific servicing example is a combat turn of a fighter aircraft. Broken items are not repaired, but if the aircraft is flyable, it is replenished with fuel, oil, oxygen, and bombs and bullets (as required) for its next sortie.

2.9. Disposition. A weapon system no longer required to meet operational needs in its current role enters the disposition process. During this process, the weapon system platform and elements are transferred, recycled, or retired based on their ability to meet mission needs. Since a resource could have significant utility in another role, its full value should be extracted before it is retired.

2.9.1. Materiel can also be disposed of in a number of ways. Air and space equipment no longer required in the total force mix may be converted to targets or drones, stored as strategic reserves for attrition fillers, sold or given to allied nations, retained for heritage programs and museum displays, converted to civilian use, or scrapped. Likewise, facilities no longer satisfying needs can be converted to other uses, renovated, or demolished.

2.9.2. Disposing of information is essential for maintaining modern air and space weapon systems. Concepts, objectives, plans, policies, and procedures require continuous refinement as the force structure is modernized. Information such as specifications, software, technical manuals, and drawings may be transferred to allied nations when they acquire similar weapon systems. Other information is retired to historical repositories to be retrieved or recycled when needed.

2.10. Summary. Military requirements are met with

eight interactive and comprehensive logistics processes affecting people, materiel, facilities, and information. These processes cover the entire life cycle of a weapon system and are applicable, at any level of command, for war as well as

for operations other than war. The final chapters of this document tie the logistics processes of creating and sustaining air and space forces with the seven logistics principles and the seven logistics concepts.

Chapter 4

LOGISTICS PRINCIPLES

3.1. General. This chapter explains the seven logistics principles that guide Air Force personnel in creating and sustaining air and space weapon systems. These principles, and the seven concepts explained in the next chapter, provide an understanding of why logistics is a key building block in the foundation of military power. The difference between the logistics principles and concepts in this document is twofold. First, principles are broad ideas; concepts cover specific actions. Second, in a hierarchical fashion, principles rank slightly higher than concepts.

3.2. Logistics Principles. The seven logistics principles (shown in Figure 3.1) are **responsiveness, simplicity, flexibility, economy, attainability, sustainability, and survivability**. They are not unique to logistics, but they are what make logistics work best. Joint Pub 4-0 (*Doctrine for Logistic Support of Joint Operations*) contains the same seven logistics principles, and explains that all of them seldom have the same level of importance in each situation. Effective support is a result of correctly identifying which logistics principle has priority in any given situation. Logistics principles, according to Joint Pub 4-0, "... are as much art as science...." Joint Pub 4-0 also states that these principles "... are not a checklist but rather a guide for analytical thinking and prudent planning."

3.3. Responsiveness. Responsiveness is the keystone logistics principle. The ability to locate, acquire, and expeditiously move resources from one location to another is crucial to successful military operations, but may be difficult to achieve. This difficulty may be caused by the fog of war or insufficient resources. Timely and accurate information provides the means to handle this challenge.

3.3.1. Responsiveness, a vital quality of every logistics process, begins during acquisition. Performance, cost, schedule, and supportability need to be properly balanced during the many years it often takes to complete the

acquisition process. Additionally, an inoperative weapon system does not contribute to military capability unless it can be fixed in a responsive manner. One example of responsiveness is the military adaptation of commercial overnight services to support delivery and retrograde movement of critical materiel.

3.3.2. Commanders may need information for entire weapon systems, not just fragmented items, to coordinate actions and assess results. Secure and responsive communications networks are needed to ensure logistics information remains in friendly hands; this is especially important for logistics activities preceding combat operations.

3.4. Simplicity. Increased standardization of weapon systems among Services and allied forces can simplify logistics operations and reduce unit costs, thereby allowing the purchase of greater quantities of support materiel. Standard weapon platforms may lead to higher compatibility, interoperability, and interchangeability of support equipment and procedures between forces.

3.4.1. Highly reliable, maintainable, deployable, and survivable air and space weapon systems are the keys to simplifying logistics support to military operations. By emphasizing these characteristics during the acquisition process, we can create weapon systems that consume fewer resources and are easier to move and maintain.

3.4.2. Simplicity can also be achieved with organizational changes. For example, the two-level maintenance concept eliminates an intermediate repair stage. Components are repaired either at the operational site or are sent to a depot when extensive work is required. A choice of two repair levels (rather than three) results in streamlined maintenance and distribution.

3.5. Flexibility. Technological advances can create new challenges. A flexible and simple logistics structure is needed to operate in virtually any environment. The

Figure 3.1. Logistics Principles.

RESPONSIVENESS	Get the right things in the right amount to the right place at the right time.
SIMPLICITY	Keep it simple.
FLEXIBILITY	Be able to operate in any environment.
ECONOMY	Be thrifty with resources.
ATTAINABILITY	Know what you can do before you do it.
SUSTAINABILITY	Remember: One must endure to win.
SURVIVABILITY	Survive first, then prevail.

logistics structure should be capable of rapid expansion, easy disassembly, and quick reassembly to form new capabilities wherever the requirement exists. Flexibility requires simplicity everywhere - at the operating site, at the port, in the depot, and at the factory.

3.5.1. Flexibility can also be achieved through cooperative civil and military enterprises. Interoperability and standardization between equipment and procedures allow other Services and our allies to share scarce resources. This cooperative process begins with joint and multinational acquisition programs and continues with training programs to develop and refine operations and support procedures.

3.5.2. Mobility, both intertheater and intratheater, provides the flexibility to distribute resources worldwide and into space for use in operations. Intertheater mobility allows the transfer of resources between theaters and across extended lines of communication. It is accomplished by airlift, sealoift, spacelift, overland transportation, and prepositioning. Intratheater mobility provides the final movement leg of the distribution process from theater ports to the operating sites. In addition, intratheater mobility also provides the emergency element of the distribution system by offering a capability to quickly redistribute assets. Finally, both intertheater and intratheater mobility systems depend on real time information to locate resources.

3.6. Economy. One of the great logistics challenges is effective resource allocation. Within a theater of operations, the goal is to attain the proper balance between the principles of mass and economy of force. These principles of war seek to apply sufficient air and space power to reach a military objective while conserving resources for future use. To accomplish this balance, commanders selectively employ forces to exploit enemy weaknesses and avoid enemy strengths. A balance between resource use and resource conservation allows the support structure to meet the needs of the commander.

3.6.1. Economy is important to the extent it contributes to military effectiveness. Early investment in the acquisition process on logistics supportability yields maximum cost-effectiveness, resource conservation, and weapon system availability. This translates into greater air and space power when an adequate number of ready and sustainable weapon systems, and sufficient spares, are available.

3.6.2. Air Force resources also require a balance between quality and quantity. More does not always mean better, since greater quantities of resources do not necessarily yield a better product. The organization and quality of people, materiel, facilities, and information are equally important. Our aim is to get the most capability from the existing force structure.

3.6.3. We know from history that high levels of attrition may occur in a protracted conflict between advanced industrial nations. A force structure that depends exclusively on quality may not prevail in the long run. In short, both the quantity and quality of available resources are important to

all military forces when engaged with an enemy who can wage attrition warfare.

3.7. Attainability. A fundamental principle for success when planning or executing any military operation is a clear and concise objective. For logisticians, the objective is to give commanders the greatest freedom possible to deploy, employ, and sustain air and space forces.

3.7.1. Attainability is applicable to every logistics activity and is just as valid when supporting an entire theater of operations as it is when supporting a much smaller scale operation. This principle has three requirements: ensure everyone understands the objective, provide adequate resources to attain the objective, and never let anyone lose sight of the objective.

3.7.2. The principle of attainability originates in the strategic planning process. The Air Force sets objectives for the force structure (the combination of weapon systems) it needs in the future. Objectives are typically broad in nature and directed at advancing the quality, capability, and effectiveness of US military forces. Additionally, objectives should foster proactive research and development projects aimed at eliminating or reducing threats from potential enemies. The enemy may then expend valuable resources and excessive effort to field more capable forces.

3.7.3. The most effective logistics support for the future can be attained when continuity exists between planning, programming, and budgeting activities. Adjustments to plans, programs, and budgets are made when strategic planning priorities change.

3.7.4. Logisticians should strive to develop new and innovative concepts, procedures, and techniques to achieve military objectives. They anticipate needs and assist strategists and commanders in developing a concept of operations to enhance the probability of mission success.

3.8. Sustainability. While each Service has some organic capability to sustain itself, every Service relies heavily on several common distribution elements. This dependency demands extraordinary coordination from many diverse functions and organizations. For instance, contracting, transportation, supply, personnel, and information functions are integrated to find, acquire, move, store, and track resources from one location to another. Organizations responsible for providing logistics resources and services to the operating commands harmonize their activities with the transportation agencies responsible for moving these resources within and across theaters of operations.

3.8.1. The magnitude and complexities of deploying, employing, and resupplying forces may stretch these distribution elements to their limit. Other Services or host nation communications and transportation functions may be a major factor in achieving force mobility and sustainability objectives while significantly reducing the mobility footprint. Without harmonization, forces and supplies may not arrive at the right destination at the time needed.

3.8.2. The principle of sustainability is most obvious in the distribution process, especially as it applies to a major intertheater deployment. Sustainability is achieved when an integrated distribution network is established to ensure a continuous and controlled flow of forces and supplies into and within the theater of operations. An integrated distribution network operates more efficiently when interface requirements between modes of transportation, ports, and storage facilities are planned and implemented. Continuous flow is improved by minimizing handling, the number of transfer points, and the number and variety of carriers. Saturation is avoided by ensuring the distribution system pushes or pulls people, materiel, and information at a rate that can be accommodated at every point along the distribution network.

3.9. Survivability. Survivability and supportability are enhanced by the complementary nature of mobility and the autonomy it provides. When weapon systems require fewer support personnel and less support equipment, they become more mobile and therefore more responsive to operational requirements. They are also better able to move from one theater to another, or more importantly, to disperse routinely in order to survive within a theater.

3.9.1. The intensity and destructiveness of modern military operations often create a difficult and uncertain environment. Shock, damage, and trauma, coupled with friction and chaos, are particularly severe during the critical early stages of an operation. Enemy or terrorist assaults on

the logistics support structure can result in organizational disruption, destruction of critical materiel, degraded communications between military elements, or loss of life. Recovery under these conditions is complicated by confusion and disorientation. Friction results from enemy ingenuity, organizational realignment, inadequate plans, malpositioned resources, poorly trained people, lack of cohesion, or ineffective leadership. To withstand the combined effects of trauma and friction, the logistics structure should be capable of surviving in a self-sustained, independent mode.

3.9.2. Survivability of the support structure can be increased by eliminating or minimizing limitations created by vulnerability, capacity, and visibility. Destruction of information networks, for example, can inhibit the ability of logistics personnel to correctly position resources in a timely manner. Because the support structure can become a target, various logistics functions can be disrupted. Therefore, it is crucial that a viable survivability plan for people, materiel, facilities, and information is accomplished for every level of logistics support.

3.10. Summary. The seven logistics principles in this document match those in Joint Pub 4-0. Principles, for the purpose of this document, cover broad ideas and, together with the seven logistics concepts contained in the next chapter, guide Air Force leaders in creating and sustaining air and space weapon systems.

Chapter 5

LOGISTICS CONCEPTS

4.1. General. This chapter explains the seven logistics concepts that guide Air Force leaders in creating and sustaining air and space weapon systems. As mentioned in the previous chapter, concepts cover specific actions and rank, in a hierarchical fashion, slightly below principles. The principles and concepts in this document show why logistics is a key building block in the foundation of military power.

4.2. Logistics Concepts. The seven logistics concepts (shown in Figure 4.1) are **pipeline security; total asset visibility; training, education, and exercises; interoperability; availability; transition to and from war; and host nation support**. These concepts, applicable for war as well as military operations other than war, reflect specific actions essential to sustaining logistics capabilities under highly dynamic and perhaps uncertain conditions. These concepts may not be applicable for every military activity, and they are not unique to logistics. For example, a true peacetime operation does not include a transition to or from war. In addition, the concept of training, education, and exercises is not limited to logisticians.

4.3. Pipeline Security. Successful sustainment of forces requires a logistics pipeline to link a weapon system with its

associated resources. This link makes it possible to sustain weapon systems with the resources needed for continuous operation as well as for retrograde movement. Spare parts, information, and consumables such as fuel, lubricants, and munitions, as well as other essential resources, should flow from worldwide sources of supply to the theater of operations without major disruption. Therefore, preserving a logistics pipeline is paramount, particularly for retrograde movement when a two-level maintenance concept is used.

4.3.1. Weapon systems today can potentially generate more sorties and deliver more destructive power; cargo aircraft and ships have many times the capacity they once had; and a decreased defense budget, higher costs, and more advanced technology have resulted in a smaller force structure. This increases the probability that a break in the munitions or fuel pipeline to a theater, or the loss of a cargo aircraft with spare parts, could have catastrophic consequences.

4.3.2. The logistics support structure reflects the increasingly fluid and rapid nature of future conflicts. Logistics processes and the pipelines linking those processes to military forces need to be flexible and secure in order to support one or more conflicts in any region of the world. In addition, the capabilities of our potential adversaries' weapon systems drive the need for mobile logistics support.

Figure 4.1. Logistics Concepts.

PIPELINE SECURITY	Maintain secure and responsive pipelines to ensure a continuous flow of resources.
TOTAL ASSET VISIBILITY	Know where things are.
TRAINING, EDUCATION, and EXERCISES	Provide in-depth training and education, and realistically exercise major logistics elements at all levels.
INTEROPERABILITY	Pursue sufficient interoperability between Service, joint, and multinational forces to take advantage of economy of force benefits.
AVAILABILITY	Make weapon system availability the ultimate measure of logistics success.
TRANSITION TO and FROM WAR	Operate in peace as in war, but when that's not feasible, provide rapid mechanisms for a transition to war; don't forget the transition from war.
HOST NATION SUPPORT	Make effective use of host nation logistics resources.

Such elements can rapidly move, disperse, or react to any requirement. One example is a high-velocity transportation system to move parts for repair.

4.3.3. Given that preserving the logistics pipeline is paramount, it is beneficial to reduce forward deployment of logistics infrastructure whenever possible, and rely on guaranteed, time-definite delivery of resupply and retrograde assets. Emphasis should continue on increasing reliability, maintainability, and availability of weapon systems to reduce the amount of resupply and retrograde required.

4.3.4. Deploying intermediate and depot-level maintenance capability to a theater of operations should be held to an absolute minimum in order to reduce the mobility footprint. Forward maintenance is replaced by daily high-velocity transportation service from the continental United States, with guaranteed, time-definite delivery of serviceable parts and retrograde of unserviceables. Future logistics support depends heavily on a secure strategic pipeline and this express service. If deploying this maintenance capability becomes essential, the decision concerning when and to what extent to deploy it is based on many factors. Some of these factors are the deployed location, timing, availability of forward-based facilities, manpower and skills, augmentation, support equipment, expected duration, and airlift requirements. When deployed, the intermediate and depot-level maintenance capability should be integrated into the theater command and control structure to ensure centralized control of essential assets.

4.4. Total Asset Visibility. The logistics structure is integrated using a command and control process to ensure the quantity, condition, and location of critical assets are visible. This is just as important for assets flowing to a theater of operations as it is for both lateral and retrograde movement. With total asset visibility, logistics problems can be pinpointed and resolved at the lowest possible level or elevated to a higher level as needed for quick resolution.

4.4.1. Knowing with confidence where parts or supplies are located, or when and how they will arrive, is the key to the logistician's ability to support operational requirements. However, during some military operations, the logistics structure becomes shrouded in "fog;" visibility is diminished over the demand, movement, storage, and issue functions. This can create enormous challenges not normally experienced in peacetime.

4.4.2. Assured communications can assist in distributing critical logistics information on a near-real time basis thus enhancing total asset visibility.

4.5. Training, Education, and Exercises. Successful forces are built through effective training and education to establish and maintain the skills needed to achieve success, regardless of the mission. The transition from peacetime to wartime operations is difficult, but can be less so with continuing education, effective training, and periodic

exercises. The same is true of the transition from war to peace.

4.5.1. Realistic training prepares logisticians to surge for any type of operation, to allocate scarce resources on a global scale, and to reconstitute major forces on short notice. At the operational level, logistics scenarios should test the deployment and resupply of forces. At the tactical level, training and exercises should duplicate the intensity of activity at a site from pre-attack through post-attack conditions.

4.5.2. Therefore, exercises should be realistic to prepare commanders and their staffs for full-scale operations. Logistics constraints should be included, not dismissed with simulations that create a false sense of security. These exercises replicate weapon system generation and air base defense under intermittent or continuous attack.

4.6. Interoperability. Interoperability provides numerous advantages for all phases of an operation. It decreases cost, speeds up processes, and facilitates operations across Services. With the increased likelihood of multinational operations, interoperability can also greatly enhance allied logistics support.

4.6.1. The ability to share fuels, munitions, spare parts, and other critical resources (including qualified personnel) can give a commander flexibility in a constantly shifting operational environment. With viable interoperability, multinational support operations would not be hindered by unique equipment specifications, skill requirements, platform configurations, and servicing procedures. As these aspects of weapon system support overlap between Services and nations, the more likely it is a commander has a truly unified force. Interoperability could also minimize the impact of potential language barriers.

4.6.2. One of the greatest challenges to logisticians is the diversity of weapon systems, fuels, and munitions. These differences can result in a complex logistics structure. Maximizing interoperability between the Department of Defense, other Federal departments and agencies, and commercial activities increases capability and minimizes waste and unnecessary duplication of effort.

4.7. Availability. Availability of weapon systems is the best measure of force readiness. Availability should focus on the whole system rather than only a portion of it. For example, aircraft operations require personnel, fuel, support equipment, spares, and usable runways. If any of these resources is missing or degraded, effective aircraft operations may not be possible. Therefore, decisions involving resources should be based on the resulting impact on military capability.

4.8. Transition To and From War. To perform effectively in war, peacetime operations should replicate wartime activity. Combat may not allow time to adjust to different organizations and procedures; therefore, attempting to

reorganize during deployment or employment can disrupt logistics support and jeopardize military operations. Combat effectiveness is the key to deciding policies for peacetime operations.

4.8.1. The transition between peace and war presents significant challenges to logisticians. Minimizing the differences in support procedures, information processes, and equipment lessens the turbulence of shifting from peace to war. Military forces are more effective when they train the way they will fight, and this also applies to the logistics elements providing the means for those forces to accomplish their objectives. The challenge to do so may be complex, but when achieved, can result in significant force multipliers. One example is composite wings. When wartime mission requirements are defined during peacetime, appropriate steps are taken to combine a mix of aircraft at a single location. The peacetime mix of aircraft is integrated into a cohesive whole prior to mission execution.

4.8.2. Just as important, but often overlooked, is the transition from war. Post-execution cannot be taken lightly, for the next crisis may be erupting as forces conclude operations. Planning for this transition should begin well in advance of any operation to ensure smooth post-execution operations.

4.8.3. Factors to consider for the transition from war to either post-war activities or peacetime operations are virtually the same as the transition to war. These include (but are not necessarily limited to) the concept of operations, continuous accountability, total asset visibility, generation, packing, and transport.

4.9. Host Nation Support. To achieve economy of force and a viable logistics structure in an international setting, the US and its partners agree on how multinational support is carried out. Air Force elements ensure these agreements are translated into specific concepts to plan and conduct logistics operations.

4.9.1. These concepts define support requirements during all phases of operations (including pre- and post-conflict). They prescribe logistics tasks affecting tangible resources (people, materiel, facilities, and information) from acquisition until use or consumption.

4.9.2. As a minimum, the concepts for each theater should address: levels of maintenance (where, by whom, and under what conditions maintenance is performed), the preferred method of distribution (push, pull, or combination, for each major class of supply), attrition replacement, and command and control of logistics resources shared by coalition forces. Additionally, logistics systems supporting either US or host nation forces operate within the environmental constraints of the host nation as well as the legal and political constraints governing US involvement.

4.10. Summary. Logistics principles and concepts guide Air Force personnel as they use the eight interactive logistics processes to convert resources into military capability. The ultimate goal of Air Force logistics is to create and sustain air and space weapon systems for use in any theater at any level of command, regardless of the type of operation.

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